SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1788.—Vol. XXXIX. LONDON, SATURDAY, NOVEMBER 27, 1869. {STAMPED .. SIXPENCE. UNSTAMPED, FIVEPENCE.

Original Correspondence.

COAL-BREAKING MACHINERY.

SIR,—Our attention has been called to an article in last week's Journal, relating to coal-breaking machinery, and to the drawings accompanying it, which are represented to illustrate the machine patented by Mr. J. Grafton Jones in June, 1867. For the information of your readers we state that the machine then patented by Mr. J. Grafton Jones is quite different to that illustrated in your Journal, which will be at once apparent to anyone who will refer to Mr. J. Grafton Jones' specification, and to the drawings he filed with it. After repeated trials with the machine therein described, and finding, as we are informed, that he could not bring down the coal with the limited expansion he obtained by inserting the wedge through a tube, he abandoned it, and patented, in October, 1868, the machine also illustrated in your Journal of the 20th inst., which consists of a series of rams, and which we believe on trial also proved unsuccessful. Nothing more was heard of coal-breaking machinery until the apparatus patented by us was brought before the Institution of Civil Engineers, and afterwards before the public in the *Mining Journal* of July 10 of this year, which comprised an arrangement of tension-bars and other details, admitting of the necessary expansion being obtained by a wedging action, and we are now surprised to find that Mr. J. Grafton Jones' machine, patented in June, 1867, is represented in last week's Journal with tension-bars, and with an hydraulic-pump, having fluid reservoir combined. It would appear, therefore, that by doing away with the tube arrangement he patented, and adopting instead our arrangement of tension-bars, &c., Mr. J. Grafton Jones has brought his machine into use, which is a clear infringement of our patent. JOHN JONES: S. P. BIDDER, Jun.

Victoria Graving Docks, Nov. 24.

NOTES ON COAL MINING—MONMOUTHSHIRE.

CWM TILLERY COLLIERY.

SIR,—This colliery has been in operation 25 years; for the last five years it has been carried on and much extended by the South Wales Colliery Company. The royalty comprises 370 acres of their own freehold, and 1223 acres of leasehold, taken of the Blaenavon Iron Company and Messrs. J. and C. Bailey. The branch railway from the colliery, of about one mile, forms a junction with the Monmouthshire Railway at Abertillery, the distance from Cwm Tillery Colliery to Newport being 19 miles.

The steam coal is sent to Newport for exportation; this class of coal is at present obtained from the Big vein and Three-quarter seams, but there are other seams available, and quite equal to these for steam purposes. Their steam coal is now being used by the Great Western Railway Company, and highly approved. Its notable properties are burning hot, and producing little smoke, quick burning, and generating steam quickly in corresponding ratio. The small coal obtained by screening from the two seams named is used for coke making. Another seam, worked by level—the Red Ash, or Cwm Tillery seam—is used as house and smiths' coal; its freedom from sulphur would, doubtless, make it valuable for iron manufacture when coked.

The strike which occurred in Monmouthshire in the beginning of 1868 has caused a depression in the trade of the colliery which is difficult to recover. The present output of coal from the pit is about 300 tons daily; previous to the strike the output was nearly double this quantity, and the capabilities are equal to a much larger production than this. Including the Red Ash seam, the production is about 420 tons of large coal daily. The hauling on the main roads in the pit on the west side is effected by engine-power, and the other parts of the pit, and the level also, are designed to have engines applied for hauling, as far as practicable. There are three pits sunk, 33 yards apart from their centres. The downcast and drawing pit is sunk through the Elled, Big vein, Three-quarter, Rock, and Old Coal seams; depth to the latter 246 yards. It has one landing at the Three-quarter 144 yards deep, and another at the Rock seam 193 yards. The middle pit is sunk to the same depth, is round, and has been used as the pumping pit. The upcast, or north pit, is oval, sunk to the Three-quarter seam; depth 144 yards. It is fitted with carriages and wire-rope guides for coal raising, but these are intended to be taken out, and a chimney erected on the pit. It will be seen that the seams dip on both sides of the pits to the west, and, owing to a fault, there is a rapid dip to the east also for a short distance, when the seams afterwards rise to the east. The ruling dip being westward as far as the workings are extended, but this is very variable, both in the rate of inclination and in its direction.

ENGINES ON THE SURFACE.—The winding-engine at the drawing pit, which in fact does all the work, both in raising coal and water, has two 26-inch horizontal cylinders, 4 ft. 4 in. stroke, direct-acting, high pressure. It raises coal from two landings; one rope-roll, 10 ft. diam., raises from the Rock vein landing; one roll, 7 ft. diam., raises from the Three-quarter seam. This pit is sunk 53 yds. lower, through the Bedelleg and Old Coal seams, but these are not worked. The water is raised at night time in tanks, by this engine occasionally; 300 tons of coal raised daily, one tram in each carriage, carrying about 1 ton of coal; each carriage runs on two wooden guides. The engine at the middle pit has one horizontal cylinder, 20 in., 6 ft. stroke, cog-wheels 1 to 3; this engine was used for pumping from the Three-quarter seam, but the pumps have been removed, and the engine was latterly applied to raising coal from the north or upcast pit, which is now suspended. The engine at the upcast pit has one 24-in. horizontal cylinder, 4½ ft. stroke, cog-wheels 1 to 3, 8 ft. rolls for three linked chains; this engine is now disused. The incline engine raises and lowers trucks on an incline 500 yards long, between the colliery and the Monmouthshire railway branch; the engine has two 14-in. horizontal cylinders, 3 ft. stroke, cog-wheels 1 to 2, one 7 ft. drum, and ½-in. chain for pulling the trucks up the incline, also on the level at the sidings; another drum 5½ ft. diameter, and tail chain; by this drum the trucks are drawn back through the siding, and to the incline head. There are five boilers for these engines, including the underground engine—two plain boilers, and three with double tubes, the fire being placed underneath the boiler; the heat returns through one tube, and back through the other to the flue.

UNDERGROUND WORKINGS IN THE THREE-QUARTER SEAM.—The two principal roads are driven on the east and west sides of the drawing pit, that on the east side, 80 yards from the same pit, meets with a fault downthrow to east 11 yards. The Big vein by this dislocation is thrown down nearly opposite the Three-quarter seam, and the road is continued in the Big vein, the latter continues to dip east for 80 yards, making a dislocation altogether of about 30 yards; at this point the strata begin to rise to the east in a variable manner. An engine and boiler, 18 ft. by 4½ ft., are placed closed together 80 yards distant from the upcast pit; this engine has one 14-in. horizontal cylinder, 3-ft. stroke, one 5-ft. drum, cog-wheels 1 to 3; the engine was applied to hauling up the dip of 80 yards, before named, but it is now with the boiler out of use. The coal from the east district is now reached by an inclined stone drift from the Rock seam, which is the lower landing, and 49 yards below the Three-quarter seam; this stone drift to the Three-quarter seam forms a self-acting incline, rises 3 in. per yard, and is 180 yards long. The main road continues east in the Three-quarter seam 500 yards or more, having branch levels at intervals. At this point another stone drift is driven up to the Big vein, 50 yards in length, rising 6 in. per yard; this also forms a self-acting incline for the Big vein workings. About 100 tons of coal are brought out per day from the Big vein, and Three-quarter seams from the east side to the lower landing. On the west side of the drawing pit the main dip is driven west 800 yards. The dip is variable, in some parts is nearly flat, in others 3 to 4 in. per yard, the undulations have been filled up so as to give sufficient fall for the empty trams to run down with the rope. The hauling engine for this dip has two 14-in. cylinders, 20-in. stroke, cog-wheels 1 to 5, one 5½-ft. drum. The steam is brought down the upcast pit in pipes, and the exhaust pipes are taken to the bottom of the upcast. The engine is placed 60 yards from the upcast pit (by the present route), to which it formerly delivered coals. At present the engine delivers to the downcast or drawing pit at the upper landing; it draws the laden trams 700 yards up the plane, and then drops them back to the pit, a distance of 80 yards, the empty sets being worked *vice versa*. About 500 yards down the dip, another dip branches off to the south, this is also adapted for engine power for 300 yards, and will be further extended. About 200 tons are raised daily up the main dip from the Big vein and Three-quarter seams, in about equal proportions. Below the south branch dip 100 yards of barren ground were passed through, the Three-quarter coal being nipped out. By following a leader that distance the coal puts in again of good quality, the roof is much stronger on the lower side of the barren ground. The water is raised from the extremities of the two dips by tanks up to the top of the engine plane, but there is only a moderate influx of water.

Near the bottom of the engine plane a north heading is being driven, and the coal got on each side of it by long wall work; the rise of the seam is to the north, and it rises considerably to the east also.

SECTION OF THE THREE-QUARTER SEAM IN THIS HEADING.

Cliff quar roof.			
1.—Coal	2 ft. 6 in.		
2.—Shale	0	0½	
3.—Coal	0	8	
4.—Shale	0	0½	Ft. in.
5.—Bottom coal	0	7= 3 9	Good coal, sent to bank.
6.—Shale	0	1	
7.—Coal	0	4	
8.—Shale	0	1	
9.—Coal	1	0= 1 4	Engine coal, not raised.
10.—Underclay.			

The gate-roads are made 10 yards apart from their centers, and are driven from 50 to 60 yards on each side of the heading; those on the east side cross the back slips, on the west side the face slips, but it is not of much moment whether the faces are driven east or west. The faces extend in this seam from 200 yards to 300 yards in length. The material for filling-up is obtained by cutting the engine coals and fire-clay in the roads as they are extended, and by re-cutting the bottom in the roads generally; the latter requires doing repeatedly. The 1 ft. 4 in. of inferior coal, not being saleable at bank, is left in the course of working.

THE BIG VEIN.—This is found 13 yards above the three-quarter seam, and is reached by a rise stone drift from the latter. The coal is got by long wall on each side of a heading; the gate-roads are driven east and west, and are 10 yards apart from their centres.

SECTION OF THE BIG VEIN IN THE HEADING.

1.—Coal, engine	1 ft. 6 in.		
2.—Clod	0	4	Ft. in.
3.—Coal, engine	0	7 = 2	1
4.—Clod	1 ft. 6 in.		
5.—Soft clod, holing	0 6 = 2	0	
6.—Good coal	4	0	
7.—Shale	0	1	
8.—Good coal	0	4	
9.—Shale	0	1½=4	4 Sent to bank.
10.—Good coal	0	4	
11.—Shale	0	6	
12.—Bottom coal, good	1	0 = 1	4 Not raised in stalls.
13.—Underclay.			

The holing of this seam is made in No. 5 bed, and No. 4 forms the roof. The coal above is of inferior quality, and remains. The lower coals, 10 and 12, are said to be good in quality, but are not sent to bank. If these beds could be obtained free from shale, the working of them would tend to diminish the cost on the other coals, 6 and 8, now sent to bank. The slips do not regularly occur in this seam, and the coal being hard, powder is used to break it down. It produces coal of large size, and it is remarkable, where the Three-quarter coal, 13 yards below, has been worked first, the gas is found to be drained from the Big vein, and the coal produced from it is said to be of larger size than if the Three-quarter coal was entire under it. This is contrary to what we should anticipate, even when the workings are all stowed close up. The colliers work with candles throughout this colliery.

THE ELLED SEAM is found 6 yards above the Big vein; it is uncertain in its thickness, good in quality, when right it is 3 ft. 6 in. thick; it is got on the long wall system, and as the Big vein is usually worked under it first, the Elled is said not to be greatly deteriorated by crushing, and the settling down of the strata. This coal has been got by a rise stone-drift from the Big vein, on the east side of the pit, which forms a self-acting incline. The engine draws eight trams each journey up the west incline; the trams are open-bodied, and carry about 1 ton of coal. The wheels have been changed lately on all from tram to flanged-wheels. The engine-plane has been re-laid with single head rails, the tram-plates taken up. This alteration proves most satisfactory, and will be carried out wherever the roads have become settled, but the tram-plates are still retained in the headings and gate-roads.

VENTILATION.—There are two furnaces in operation for the ventilation of the colliery. The old furnace, 8 ft. wide, is placed 80 yards from the upcast, and adjoins the engine and boiler, now out of use. The new furnace, 9 ft. wide, is placed 6 yards from the bottom of the upcast. The distribution of air is 35,000 cubic feet to the west side workings, and 28,000 cubic feet to the east side workings: total, 63,000 cubic feet. The consumption of coal is 5 tons in 24 hours; this equals 8076 cubic feet of air per pound of coal used. The ventilation has been greatly increased by the new furnace. In 1856 an explosion occurred in the Three-quarter seam of this colliery, whereby 13 men were killed. The cause of this was holing into some abandoned stalls, unventilated, and where gas was likely to be found. As the fireman reported that the place was all right after his examination, the workman entered into his place with a candle; no sooner had he done so than the gas exploded, with the result named. There was some doubt in this case of the fireman having made the necessary examination; and there was probably neglect in not having the abandoned places ventilated. Two or three smaller explosions have since occurred. One of these was caused by the collier on entering his place, and putting his candle up to the roof, the gas which was lodged in the face exploded; this was soon after the usual examination had been made by the fireman. The poor collier was fatally burnt, and there was evidently carelessness on the part of the officer. Another case occurred in the Three-quarter seam. After the fireman had examined the places, including a stall not at work, a boy went into the place a few hours later and fired the gas, and burnt severely a man who was near the end of the stall; the boy was not so much burnt. It appears in the interval between the fireman and boy being in the stall some other men had built up the air-road to the stall, and stopped the ventilation, which led to a small accumulation of gas, and an explosion in the way described.

RED ASH SEAM.—This is worked by level, driven to the east about 800 yards. Section is as follows:—

Rock top.			
1.—Inferior coal	0	3	Thrown back.
2.—Coal	0	8	Sent out.
Parting.			
3.—Coal	0	8	ditto
4.—Clod	0	6	Ft. in.
5.—Bottom coal	2	0= 3 2	Sent out.
6.—Underclay.			

The coal is worked on the long wall principle; gate-roads 14 yards apart, and they are driven principally eastward on the back, others nearly south on the end. The small is stowed underground, the large only brought out. No gas is emitted, and candles are used. About 120 tons of large brought out daily; this is sold as house and smiths' coal at the depôts on the Monmouthshire Railway. The seam rises to the east, and the haulage is intended to be worked in and out by engine-power. Ventilated by flue at the mouth. The coal is sent down to the railway by a self-acting incline 300 yards long. The trams are placed on carriages. There are 42 coke ovens, which utilise the small from the pit screens: 103 cottages for workmen have been built by the present company, in addition to 57 others previously built; the rents for these are 9s. and 12s. per month, which includes fire coal free.—*Nov.* 23. M. B. GARDNER.

THE CHANNEL PASSAGE.

SIR,—How to effect this passage by railway communication is the important question of the day; and I had hoped that some one of greater ability than myself would have taken up this very interesting subject.

Various schemes have been proposed, and strongly recommended by the projectors and their friends, to ensure a safe and continuous railway communication between England and the Continent; of these two only appear to stand proof against the many reasonable objections denouncing their impracticability—the Tunnel proposed by Mr. Low. M. Thome de Goumond, and other eminent engineers; and a Bridge proposed by M. Boutet, a French engineer. Of the latter much need not be said, as I am of opinion that, even if an attempt were made to lay a bridge across the Channel, a distance of 23 miles, the difficulties to be got over are so numerous and great as to place it beyond the possibility of success. That M. Boutet possesses skill, experience, and courage I do not for a moment doubt, but before introducing such a momentous undertaking I think experiments of less magnitude should be made to span rivers of one, two, or five miles broad before attempting to cross channels, &c.

The Tunnel scheme appears to me to possess the most reasonable chance of success. Tunnels have been made through mountains, and under rivers, shafts have been sunk to great depths, and levels driven there for some distance under seas. These are all experiments towards proving the feasibility of this great scheme. Engineers of the highest practical skill and knowledge have thoroughly investigated every point likely to prove prejudicial to the working of the tunnel. Chalk could be easily worked, and so clear from fissures that no doubt need be entertained but that great and rapid progress could be made, and a comparatively short period of time would be required to complete the work. Mr. Low is practically conversant with the exploration and ventilation of mines of every description, and is confident of success. The plan of operation proposed is to sink two shafts the required depth each side of the Channel, then to drive parallel driftways or levels, 6 feet in diameter, from these shafts under the Channel, making a communication at intervals for ventilation. This mode of ventilation is unmistakeable, as a great mining engineer once said—"Tunnel ventilation after this style could be driven around the world." A communication once effected by these trial drifts removes all risks or doubt of the effectual completion of this unparalleled undertaking.

For the carrying out this great object the company is being formed, and the two Governments have signified their co-operation, so that in a few months we shall see operations commenced, and the work prospering, and with all my heart I wish it complete success.

A MINER.

INTERNATIONAL COMMUNICATION BY CROSSING THE CHANNEL.

SIR,—The *Times* says, on its own authority, that two of the projects suggested have been discussed and discarded by practical men—viz., the Bridge crossing *over* the Channel and the Tunnel crossing *under* the Channel; and that the preference is given by those practical men to the "Ferry Project," as proposed by Mr. Fowler, C.E., &c. May I be permitted to ask by whom, and when, and where was this conclusion arrived at, and decided on? for it certainly has not had what was suggested for it, "An International Congress Meeting of unprejudiced and independent members from both countries—England and France—to determine which project is most likely to be of most advantage and benefit to the general community." On this decision hinges the whole affair, and it is not fair, nor just, to cry down the

Bridge or Tunnel merely to gratify the whim or caprice of some great engineer, as occurred in the case of the opinions given by the late Robert Stephenson on the proposed Suez Canal, which has now been completed despite his veto, combined with the prejudices of the late Lord Palmerston and other political opponents. As one of the Tunnel projectors, I ask for myself and others "fair, open discussion," without favour or prejudice. ——— W. AUSTIN, C.E.

MINERAL WEALTH OF SPAIN.

SIR,—I have been much gratified with the letters which have appeared lately in your valuable Journal on the above subject, written by Mr. B. H. Howarth. I see many of my old haunts most accurately described, and especially the silver-lead mining districts in the South of Spain, those near Carthagena, Sierra Almagrera, &c., and the lead smelting-works of Almeria, Adra, &c., the lead mines of the province of Cordova, as also those of copper.

There are several argentiferous copper mines on the slopes of the snow-capped Sierra Nevada, near Granada; this peak is 13,600 feet above the sea, and towers over the many mountains which constitute the great beauty of the panorama seen from the Alhambra. These slopes and precipitous defiles were the last refuge and retreat of the Moors. Gold is found in the beds of the rivers Darro and Xenil.

The province of Teruel, which formed in past ages part of the old kingdom of Arragon, abounds with various minerals—good coal beds and iron ore as a close neighbour, argentiferous copper ores, quicksilver, manganese of the best and richest quality, and native sulphur ores in seams.

I received a letter from this province from my brother, Mr. T. Sewell, stating that mining operations are beginning to be actively pursued by some Madrid companies, two of which are doing very well. Some very thick bituminous seams have lately been discovered, which give a very high percentage of gas; and some Barcelona merchants are about investing capital to develope this new industry, for up to the present day all gas in Spain has been manufactured from English coal.

I quite agree with Mr. B. H. Howarth as to the great mineral riches of Spain. During the five years I resided in that fine country I inspected the mines of nearly all the provinces, even those of the Pyrenees, and I was not surprised to see so many mines lying idle. The mining laws at that time offered *no security* for the peaceful possession of mining properties, and these drove many a foreign company from the soil. However, a great change has taken place in that respect. The Provisional Government wisely abolished the old mining laws, and reduced them all into one simple and defined law, that of paying a small royalty to the Government, with special protection for rights and undisturbed possession. This in a great measure, no doubt, is the cause of the present activity of the natives in mining operations, as capitalists can now safely invest their money without any fear of being molested by lawsuits. The Bill passed by the Government, a copy of which was forwarded to Mr. H. B. Howarth, and published in last week's Journal, conceding exemptions of duties for certain periods to all those who start any industry, is certainly a most important addition to the various decrees of the Provisional Government, and will, no doubt, in time attract even foreign capital into the country.

One of the great drawbacks during my residence, between the years 1860 to 1865, was the total absence of religious toleration. Many will say, what has this to do with mining interests? I will now relate a little episode. We had a most pious Catholic priest in the village from whence we derived our labouring force, which amounted to about 60 men. His pious and strict dogmatic religion made him watch closely over his flock that it should never be tainted with the heretical faith of their English masters (who never interfered with their faith or religion in the least). This pious man denounced us cronically, Sunday after Sunday, from his pulpit, as men only fit to be burnt alive in the article we were manufacturing (sulphur). But, thanks to the good common sense of the Arragonese peasants, they never took notice of their pious spiritual protector, and always behaved most respectfully, and we never had to complain of their conduct. This at last so incensed the worthy man that he prayed to the Almighty that he might send the lightning down on us to annihilate the heretics. Now, in the summer months we are visited by severe thunderstorms, and the lightning often strikes different objects. I well remember the day: we had a terrific thunderstorm, we heard a fearful detonation; a few moments afterwards came one of our own workmen to inform us that the steeple of the curate's church in the village had been struck by lightning. The poor boy on the belfry, who was ringing to charm away the storm, as is usual in Spain, was killed. The lightning struck the altar, singed the curate's clothes, and knocked down the patron saint, breaking his nose; one of his eyes was completely smashed in, as if he had had a round with his powerful opponent. This naturally was a good, sound, and logical demonstration to our good workmen that their spiritual protector had no power to bring down the elements on us. This pious man was so overawed by this little incident that we were never troubled in any way again by him. In fact, we became very good friends. We are not revengeful, as a race, and we can always afford to overlook injuries. Intolerance in Spain can now be looked upon as a thing of the past, since the Government decreed freedom of thought.

A most important fact in mining in Spain are the low wages—1s. to 1s. 2d. a day (12 hours work); we did not enforce it, but it is an old established rule, and everybody connected with mining is fully aware that wages are a great item in mines, more than any other branch of industry. Low wages on the Continent are, no doubt, one of the main causes of the great competition with English manufactures. I expect I shall be leaving for Spain about the month of January, to report on some mining districts, and I hope then to be able to give you some information as to the state of that rich mining country.

Westbourne-terrace-road. ——— HENRY SEWELL.

ON THE ASSAYS OF SILVER ORE—No. IV.

SIR,—Tetrahedrite (fahlerz, grey copper ore) is an ore which always contains a little silver, sometimes a considerable amount—and then constitutes a valuable silver ore—and sometimes mercury, in place of silver. In a former letter (July 6) I gave the results of several assays of tetrahedrite from Cornwall, in order to show the yield of silver given by this mineral when worked for some time in a regular manner. The highest results were under 80 ozs. of fine silver per ton of ore raised. I assayed this ore for four or five years consecutively as it was got from near Lostwithiel, the heart of the Cornish silver district. Assays were also made by the buyers, and these assays were checked by those made in my laboratory. The mine was worked for several years, and many thousands of pounds were expended upon it. The ore raised was sold, I believe, at very fair prices; but, for some reason or other, the mine was abandoned. The tetrahedrite raised was, in some instances, very beautifully crystallised in its well-known form (modified tetrahedron, hence its name), and with the peculiar *rough* dull surface which has been mentioned by mineralogists as characteristic of the crystals of Cornish specimens. Now, the Saxon and Hungarian specimens of tetrahedrite, which are richer in silver, are brilliant, and do not present that peculiar rough leaden aspect to which I allude. I never got more than 80 ozs. of silver per ton of *dressed* ore from this Cornish tetrahedrite which exists in the neighbourhood of Lostwithiel. But ore was sold which contained considerably less, say 25 to 35 ozs. (dressed ore), with about 6 per cent. of copper. In exploring this mine it was thought that some very much richer variety of grey copper ore would be met with, and I believe much was done in the way of sinking, driving, pumping, &c. Doubtless splendid specimens of better silver ore than this have been occasionally met with in Cornwall, but never, I am told, in any quantity.

This leads me to another important point in connection with the assays of silver ores. People often believe that the assay tells everything. It is true that it tells us a great deal, and that it is an indispensable element of mining; but sometimes it merely represents the composition of the particular specimen sent to the chemist, and, in such a case, can only determine the kind of ore which the mine yields, or may be it is only made upon some rare mineral found in a lode which will yield, when regularly worked, something quite different. I could mention a mine which after working for a short time for silver yielded a little copper, and finally turned out a very good iron pyrites mine. In most cases, where the samples are well chosen from large bulks of material, the assay tells us the true practical composition of the ore, or the dressed ore, as the case may be. But an important feature of the question is still wanting—another element is required to ensure success, which it is not the duty of the chemist to ascertain. I allude to the *quantity of ore per fathom*. This is, in fact, the true *quantitative analysis of the mine itself* after the chemical composition of the ore has been ascertained. We have, then, in all mining operations to consider two things as of the utmost importance, upon which the whole success of the undertaking will eventually turn, and most especially so when the product worked is an ore of copper or silver:—

1.—The chemical composition, the percentage of copper, or the number of ounces of silver per ton of ore—*i.e.*, the assay of the ore.

2.—The quantity of ore per fathom—*i.e.*, the assay of the mine.

Only a few months ago did I see a lead mine in one of the most promising districts of Germany totally abandoned, not on account of the results of the assay (which gave 70 to 80 per cent. of metallic lead from hundredweights of assorted ore), but because, in spite of the large lumps of crystallised galena, there was not quite sufficient ore contained in the fathom to repay the cost of working; nor was it found, after much exploring, that the lode showed any tendency to increase in thickness; on the other hand, the silver mines of Mexico, the ore of which, when assayed, shows a comparatively low figure, have been worked for years past, on account of the great abundance of the ore.

The constant duties of the laboratory have hitherto prevented me from exploring the produce of English mines *in situ* as much as I could have wished; but, from what I have already gleaned, it appears that silver is dispersed very generally through a great variety of Cornish and Devonshire ores, not only in grey copper or tetrahedrite, but in iron pyrites, copper pyrites, mispickel, &c., and is often found in rocks and gossans when no particular mineral is visible to the eye, aided by a powerful lens. A very great amount of ore, which will yield to assay from 5 to 20 ozs. of fine silver per ton, exists throughout these two counties, and, if some novel method of extracting this quantity of silver on the spot, or at a slight distance from the mines could be discovered, it would open up a new field of metallurgical enterprise in Great Britain. T. L. PHIPSON, Ph.D., F.C.S.,
Member of the Chemical Society of Paris.

Analytical Laboratory, Putney, S.W., Nov. 23.

THE ASSAY OF SILVER ORES—DR. PHIPSON AND OLD TREBURGETT.

SIR,—Why Dr. Phipson, in one of his letters in last week's Journal, should stigmatize as "angry communications" the letters which appeared on the 13th in answer to his covert attack on Old Treburgett, I am at a loss to conceive. The only conclusion I can arrive at is that he is wont to look upon every communication which exposes his own errors or mistatements as "angry." To every outsider the letters in question could appear in no other light than that of calm and reasonable exposures of rash statement, calculated, if not intended, to do mischief to the undertaking they referred to; and upon referring to a correspondence carried on in the *Chemical News* of January and February, 1866, it will be seen that this is not the first time that Dr. Phipson has been called to account for rash and unguarded statements. In the Doctor's first letter (Nov. 6) he makes a most unmistakeable allusion to Old Treburgett, upon which the whole of that letter is evidently a covert but unfounded attack. Yet in his third letter (Nov. 20) he says that his "remarks had reference to a purely scientific subject, and that no mine or mining company had anything to do with them." But how the Doctor could make *this* rash assertion in face of his other letter, which appears on page 872 of the same number of the Journal, is a moral puzzle which I will not attempt to solve; but will leave the case to its own merits, seeing that the one letter (on page 872) is a most complete refutation of the statements of the other (on page 883). OBSERVER.

EAST WHEAL LOVELL.

SIR,—Now that this mine is upon its merits attracting probably more attention on the part of the investing public than any mine in Cornwall, it may, perhaps, not be altogether without interest to those unfamiliar with the district to be put in possession of some hard facts, which, however discomfiting to the croaking "bears," cannot but be accepted by the unbiassed, and those who hesitate to sacrifice their veracity for the sake of increasing their gains, as at least analogical data in favour of East Lovell becoming equally productive, and profitable with those mines by which it is literally surrounded.

Old Wheal Lovell has returned tin to the value of more than 200,000*l.*; Trevenen has yielded in dues alone more than 20,000*l.*; and Trumpet Consols has produced tin to the value of more than 500,000*l.* These, simple statements, I take it, are sufficient of themselves to dispel the semi-sensational equivocations of advertising empirics, now regarded by all observing people as the idiosyncracies of peculiarly constituted minds.

The admitted mistake of Capt. Pascoe as to the interposition of the granite in the shaft is another very ugly feature for the "bears," who (up to the time Capt. Pascoe confessed his incorrect statement) were busying themselves by drawing sections showing how this granite *must* by its underlie entirely cut out the tin. The utter absurdity of all these disparaging proceedings was made palpable to all when Capt. Pascoe himself, whom whose report they had been based, considered of his duty to retract his former statement, to admit his error, and to add these significant words—"that (upon his second visit) he was pleased to say the prospects were greatly improved; the deposit of tin in the shaft is very rich, *and lengthening westward under the granite.* The deposit on the south lode also has improved." What will be the next canard of the "bears?"

Nov. 23. ——— A DISINTERESTED OBSERVER.

MINING IN CARDIGANSHIRE.

SIR,—For some time past I have promised to pay a visit to the mines of the Rheidol Valley, and make a report of the result. To those, therefore, whom it may concern I give my just opinion of those mines which I saw on Saturday last. First the Bwlch Mine: they had a day or two before I came there made a good discovery, of which Capt. Barbery reported in last week's Journal; but without speaking much of the abilities of the past or of the present agents, or management of such mines, I do think it very strange that this run of mines should be allowed to have been idle so long, and now for the riches to be obtained by their driving a cross-cut from a level driven by the former company, a good many fathoms to intersect the lode, and from this lode they are now, as on Saturday last in my presence, drawing away splendid work, I firmly believe that this mine (knowing that from the level spoken of above it stands whole to surface) will ere long stand as high in the market as it ever did, and perhaps much higher. Glan Rheidol comes next, under the management of Captain Elijah Pierce, worked by a company of gentlemen in London. The bottom level of this mine is the 50 fm. level, and in which the lode was not all taken down: they had to cross-cut through it to try its breadth, and in so doing they discovered a beautiful vein of lead, running east and west, worth about 30*l.* per fathom The ground is hard, but by keeping a good body of miners at it, it must soon be supplying the shipping port of Aberystwith with an abundance of mineral. In this mine there are two lodes, running east and west. Yet one of them runs more to the north-west than the other, and it also dips much faster than the other, consequently by the sinking of their engine-shaft another 12 or 15 fms. it will meet the two lodes together. Again, westward of the grant in the meadow below the floors, there also the two lodes will meet; therefore, in looking over this piece of valuable property I must say of it, as of the Bwlch Gwyn, that they will surely prosper, and make good returns to their respective companies, and also handsome dues to their worthy lords. I would add of the Glan Rheidol Mine that a new shaft should be sunk in the meadow.

The next in rotation, but over the water, the south side of the river, is the Gwaith-Coch, known for many years for its great amount of black jack and lead. They are now driving extra levels or cross-cuts into the high hill, to intersect other lodes known to be traversing through the land. Some part of the company were expected there on the day I visited the vale, consequently I hurried on to the adjacent mines—as the Gellirerion, the north side of the river, the Tyllwyd, &c. The first of the two has been, and still is being, worked by Capt. Northey and party, where they are driving a level from the side of the hill, but with what success it remains to be proved; however, it turned out some good lead many years ago. When I had the management of a mine in the vale I often called at the Tyllwyd Mine, and have frequently seen some beautiful stuff brought to surface, and why it does not turn out now as good as any mine in the valley I cannot say, unless it is because it has never been worked, and a good reason too, as all that is wanted to ascertain what is there is a little money, confidence and science. In running down the river, on the south side, following Gwaith Coch, is the Gothic, known for many years by different parties, who have all endeavoured to make money; and in my day money was made, but since how it has gone on I am not able to say positively, although we may well know that both money and labour have been expended on and about the mine. Yet of this I am certain, that with careful working, and by erecting little but good machinery, the mine would do very well.

There are but few now being worked in the vale from bottom to top—I mean as far as to the Devil's Bridge falls—that I should give much attention to, except the Glan Rheidol, Gwaith Coch, Gothic, and the Tyllwyd, and all of these with care and judicious management may become good mines. This valley is between the Bronfloyd, East Darren, Bwich Consols, Goginan, and the Vale of Ystwith, Frongoch, and Lisburne Mines, well wooded, and an even supply of water from the celebrated Rheidol River, to work any amount of machinery that may be required for any purpose whatever. The mines spoken of need no comment from me, each speaking for itself; but in looking over the Journal some two or three weeks ago, I was much pleased with the remarks made upon the Bronfloyd meeting. Evidently Mr. Balcombe has worked this mine for years with great courage, and has, at last, brought it to the point he always said it would attain. In looking further east and west the ground is all taken up; eastward by Messrs. Taylor and Sons, who for years have prospered in many of the good mines of Cardiganshire. The western part of the land, adjoining Bronfloyd, has been taken up by others also old and experienced in mining—Captain Trevethan and Sons. The western ground has a beautiful southern aspect, the fall in the hill is very regular, and from the boundary of the Bronfloyd Mine eastward to the western boundary on the course of the lodes is more than ¼ mile; at the foot of this hill a cross cut has been driven about 50 fathoms, and they are expecting by continuing the cross-cut about 10 fathoms further to intersect the Bronfloyd rich lodes, where upon driving on the lode at the extreme east a back of 60 fathoms will be left. There are lodes running through this sett which are not found in the Bronfloyd Mine, as it extends in a south-easterly direction further than that mine, consequently it must be a very valuable piece of mining property. SAMPSON TREVETHAN, Jun.

West Bronfloyd Mine, Rhosgoch, Aberystwith, Nov. 24.

MINING IN NORTH WALES.

LLANENGIN.—Few, very few, mining men know much of this place. It is a small country village, situate eight miles north-west of the town of Pwllheli, Carnarvonshire, and is again about to become as familiar to the ears of miners as it was nearly half a century ago, when the Williams, of Cornwall, and the Messrs. Taylor worked the old Penrhynddu Lead Mines, which are within one mile of our country village; and the Tan-yr-Allt Mine, I may say, is in the village, or rather much of the little city is in the sett of the Tan-yr-Allt Company. Strange, after a lapse of many years from this mine, and from his country, that the instigator of the mines being again set on foot should return to this village, and apply for permission to search for the hidden treasure—a treasure, indeed, that thousands have walked over, many of whom thorough miners, and of the old school, who professed the art of the dowsing-rod and dreams, &c., but it remained for Evan Edwards, a native of Llanengin village, to come home and work the property. A shaft had been sunk from surface about 12 fathoms; if the old party had sunk 9 ft. deeper they would have found that treasure, which has so long laid there for the present Tan-yr-Allt Company. But they did not, but drove east and west from shaft, leaving a wall on one side, supposing they were on the lode. The distance (united) driven was 24 fms., then abandoned, until Mr. Edwards cut 18 in. through the wall, and got into the ore, where he raised, by simply cutting out the side of the old level, about 100 tons of ore. More perfect specimens of galena I suppose could not be seen in the Principality, lumps or rocks of ore that would with difficulty be rolled through an ordinary doorway. The indications, too, at Parry's shaft, on property subsequently leased to the Tan-yr-Allt Company will, if I mistake not, be equally productive; the sulphate of baryte, the gossan, and other parts of the lode are identical. The Imperial or Assheton Mines, too, are good speculations, formerly known as Penrhynddu, and the lodes appear to run in each others ground, more particularly the latter into Tan-y-Allt. I have carefully examined other properties between these two valuable mines, which are about half a mile apart, and at one place in particular I saw fine specimens of lead ores. I am confident that the position of this ground must embrace the lodes of these two mines, unless there are any north and south lodes, and I can heartily congratulate the lessee on his obtaining so valuable a property; and if reports are true, and I believe they are, the Tan-y-Allt Mine should also have been his. Mr. Henry Sewell, an eminent engineer, speaks highly of this property, having inspected it last week.

Nov. 24. ——— A MINER.

NANTEOS CONSOLS MINES.

SIR,—The operations of the company who have fortunately become possessed of this property have proved remarkably successful, showing that the mines of the Cardigan district have hitherto received a but very limited development, or that those who have been entrusted with their management have been unequal to the duties which they have undertaken. There is but little doubt that many mines in the neighbourhood will, upon the careful examination of competent mining engineers, be found to be of equal value to the Nanteos Company's property; at present, however, for the benefit of the public who subscribe to and take an interest in mining affairs, the following facts should be made known through the columns of the *Mining Journal*. The Nanteos Mines are situated in the richest district of Cardiganshire, and have been previously worked, with varying success, by different mining companies and private individuals. The principal noteworthy results of the operations, however, have been the raising and sending to market lead and blende ores in considerable quantities, the laying open and developing of three of the lodes which pass through the setts, the driving of deep adits which unwater the mines to a great depth (70 fms. at some points), and the formation of reservoirs, &c., which will supply with water the power necessary for crushing and drawing purposes. The results of the present proprietors' operations are the erection of the necessary water-wheel, crushers, &c., to work the mines to a great extent, and the discovery not only of new deposits of mineral but also of large and valuable courses of lead and blende at points the former owners of the mines considered to be unproductive. At the 26 fm. level a course of lead is being driven through, which produces on an average 2 to 4 tons of lead per fathom, besides blende. The bottom of the 16 fm. level produces a like quantity, and it has been found by cross-cutting into the side of this level that a valuable lode has been left standing, which may now be worked away at so small a cost that it will leave large profits to the shareholders; and it is the general opinion of all practical men who have inspected the mine that the lode remains by the side of the levels, not only at the two points where it has been discovered, but from the surface to the lowest point yet reached.

The very large number of mines lately brought before the public renders it a difficult task for the capitalist to select the most promising for investment. The Cardiganshire district, however, should not be overlooked by him, as there are many properties in it which, if they do not offer so great promise of early success as the Nanteos, are well worthy of an outlay being made upon them; and as far as one is able to judge from appearances and experience, will amply repay for exploration and development.

Reference to the weekly report of these mines in last week's Journal, made by one of the most careful and cautious agents in Wales, will more than confirm the prospects and value of the mines mentioned in the above remarks.

Nov. 26. ——— C.

[ADVERTISEMENT.]

VIRTUOUS LADY MINE.

SIR,—I feel it my duty to inform the shareholders and public that I have made a great mistake respecting this mine, and to acknowledge that my opinion upon some points turns out to be most erroneous. However, I can lay claim to having had honest intentions, and after my earnest endeavours to explain matters to the best of my feeble ability, I must throw myself upon the clemency of my misguided patrons. But let me at once, without any further preliminary struggle, confess my fault. It is, perhaps, pretty well generally known, and in the way of emphasis I may add universally acknowledged, that I have not allowed weeds to grow upon the way side in my humble endeavours to extol the merits of the Virtuous Lady Mine. I have even gone so far as to say that in my opinion it will speedily become one of the richest mines ever yet discovered. These are, perhaps, strong words, but it is easy for anyone to make a mistake. This I know, that my earnest expressions have brought forth many comments for and against me in the way of small talk, although no one has openly come forward and told the public that I was deluding them. Now, there can be but two things—either the mining world and its representatives have like myself had faith in the mine, and could not with a clear conscience run it down, or otherwise they show themselves before the public as being capable of allowing soft speeches, *alias* gross falsehoods, to be uttered to the further detriment of mining, which, goodness knows, has suffered sufficiently in the past from "black legs," without attempting to oust the swindle, and defend the honour of mining, and offer a protecting hand to its supporters—the public. In my mistake I maintain the whole mining world is to blame. Some may put forward that the property was brought out without a single report, but I say this, that if mining men be honourable, and I believe and know that some are, never in the annals of mining history has a mine been so generally reported upon. The report is written by my pen. It has been drawn and signed by me, and accepted by the public, but I maintain this, that your very silence as men of honour has backed and endorsed the draft until there is not room for another signature. This may, perhaps, be a novel and unique way of getting an intensely favourable and very general report, but you may rely upon its being a very cheap method, and particularly efficacious. But I am almost forgetting my fault, which I long to confess, and receive absolution, as it certainly is pardonable, and is more of omission than commission.

If any of your interested readers will refer to my earlier letters they will find that I always predicted a very rich mine when I first saw the property, entertained the matter, and commenced explorations out of my own pocket before calling in the assistance of the public. I was amused, and certainly did not credit the strangely plausible tales poured into my ears, that I had only to fork the water and there was copper already laid open, left by the former workers; it was rather too much of a pill for even a young practitioner to be made to swallow, and I pooh-poohed the very semblance of such a thing, and in several of my letters I have totally ignored the idea of our going down into a land at once flowing with milk and honey; but here is the mistake I have at last arrived at. I have been decidedly wrong, and now for the practical proof.

We are down 11½ fms., and are this day dropping the lift to the bottom of the shaft, so as to fork right out. The machinery is working admirably, and not a single breakage or hindrance of any kind has occurred, but the workings are so large that it is like draining a sea. The water-wheel had not been at work a week before several good pitches were discovered, and one or two have been set to tributers, but we find the real cream as we get deeper—for instance, Captain Horswill's attention was last Monday drawn to a great peach lode, some part of which is rich for copper. He further discovered in this lode—the width of which is not yet known, it being so large—a vein of SOLID copper ore, about 4 in. thick; this has already spread out to 9 in. thick of solid copper ore, a fair average assay of which, by Mr. Harvey, our assayer here, shows a result of 28⅜ per cent. copper: 1 ton of this is worth more than 5 tons of the average quality of copper ore sold in England. The discovery is in whole ground, and being under the hill there is a back of at least 20 fms. Some very exceedingly clever men might argue it may not last longer than to turn out 10 or 20 tons. Granted. And on the other hand I claim that there is every prospect of its getting wider and wider, and, perhaps, leading to a gulf of copper. All mining men know that with a leader of solid copper, 9 in. thick, in a lode composed of peach, some of which is handsome and most profitable saving work, without a minutes notice, and by a touch of the magic wand, as it were, this very peach may turn or lead into solid copper. Again, this is only one of the many rich places we are sure to find as the deeper part of the mine is drained. There are tributers now, knowing the mine well, who want to take pitches near the "Clan" shaft before the water is out, and it can be seen by our agents, at 5s. in it. Further, an old man who worked in the mine 30 years since has offered for 10*l.* to lead us to a spot where by his own labour he will open up a course of almost solid ore several feet wide, and have nothing unless he carries out his agreement. It is best to make good as we go, and I think so far my predictions have been more than verified. I have no doubt that we shall find thousands of tons of copper at our present levels, but my aim is for deeper points, and cross-cutting to several well-defined lodes upon which nothing has been done, save sinking just a few feet at surface. What is this orey peach going to make in depth I ask you? and now you ask me, what is it going to make with the whole

mass of mineral indications, the like of which have hardly ever been seen elsewhere? Say you have asked me. Well, I will gratify your curiosity, and for the benefit of your edification inform you that we shall in depth—aye, and length and breadth—open up such treasures of mineral wealth that will startle the very mining community. Make a note of that.

I observe that some brokers are still trying to "bear" down the shares—for instance, in last week's Journal, page 840, a West End Share Agency affair offers for sale 200 Virtuous Lady shares at 27s. 6d. I have written to buy them, but no response, and I hear from intending shareholders who have applied to me for shares at 2l. that they now decline, as they can buy them elsewhere at 27s. 6d. This is really too bad. Out of more than 60 shareholders it is quite possible for those who purchased at 20s. to be deluded by brokers as to the value of the property, and so be advised to sell out at 27s. 6d.; but somehow or other it seems to strike me very forcibly that they would, if they lost faith in the enterprise, prefer 37s. 6d. from me, which they can have by return of post, to 27s. 6d. through brokers. I notice that this West End Agency boasts of having no connection with any other firm; this is particularly fortunate, as it at once frees every one else from having had anything to do with at least this transaction.

I beg to notify to the shareholders and public that Mr. James Crofts, of No. 1, Finch-lane, Cornhill, now represents the company as its broker, and in the further buying or selling of shares I feel confident that they may place themselves in his hands, and rest assurred that as a broker he will do his best for the interest of his clients. Enough is already discovered, added to our indications for positive masses of copper at many points upon further exploration, to warrant these shares being now raised to 3l. each—in fact, they are this day worth 5l., as anyone can see that the mine, with its trifling expenses and great treasures of wealth, cannot fail to speedily give most handsome dividends. However, a few more hundreds can still be had at 2l. per share, either through Mr. Crofts or myself. The shares will be transferred in order of application, and I reserve the right to at any moment refuse to sell at this price.

I earnestly invite all mining men to visit this property. It is, indeed, a wonderfully marvellous and most extensive mineralised piece of mining ground. To the truly practical it cannot fail to give intense interest and instruction, and serve as a stimulant to renewed energies in endeavours to explore for the mineral which most decidedly exists in numerous places that I could enumerate within a few miles of Tavistock, which is comparatively maiden ground. The Devon Great Consols, which has been one of the richest mines of the day, is a convincing proof that this is a good district, and I must give my earnest opinion that the Virtuous Lady will after 12 months exploration become a richer, more lasting, and greater dividend-paying property than even this most successful mine. Make another note. To the Tavistocklans, who I know have suffered much by the depression of mining the past few years, I would say, be of good cheer. Bright and glorious days are just at hand, and you will find next summer's sun shining brightly upon mining generally, and brisk and increasing business.

A word for investors in foreign mines. Spend not all your spare capital in far off lands; reserve a little to share in the search for and discovery of the almost inexhaustible mineral wealth that exists in your own pretty little isle. For a trifling expense in a few hours you can be transported to a perfect little miniature Colorado in the Virtuous Lady, and one of the most wild, romantic, and picturesque scenes ever witnessed at home or abroad. I invite the uninitiated in mining enterprise, and those who love novelty, and have a desire to see nature, blended with art, or rather the rude toil of the rough miner, a visit here will enable them to behold a little of what is going on in the world out of their own peculiar sphere or business of life, and I am sure such a visit upon and under the mine would be one always remaining freshly stamped upon their memories. Lastly, to those who abhor mining, forgetting that everything in this world owes its existence to the earth, either at surface or in its bowels, and there are some disagreeable old curmudgeons who do detest mining, simply because they have lost a few pounds in some unfortunate or more likely half explored adventure, I would say, pay a visit to the Virtuous Lady Mine, and I sincerely believe that even such as you will be so enraptured that you will not be able to refrain yourselves, and allow the golden opportunity to pass by without at last evincing a desire to cultivate a taste for it.

5, Abbey Mead, Tavistock, Nov. 11. THOS. J. BARNARD.

VIRTUOUS LADY MINE.

SIR,—We are down 15 fms., and the mine is improving every day—in fact, our several distinct discoveries of the richest copper ore in the old workings so exceed our most sanguine expectations, and the general indications are so marvellously remarkable for masses of mineral being close at hand, that I must refuse to sell another share under 50s., and the prospects are that they will be up to 5l. before New Year's Day. THOS. J. BARNARD.

5, Abbey Mead, Tavistock, Nov. 18.

[The two foregoing letters were unintentionally omitted last week.]

[For remainder of Original Correspondence, see this day's Journal.]

Meetings of Public Companies.

THE PRUSSIAN MINING AND IRON WORKS COMPANY.

(Preussische Bergwerks und Hütten-Actien Gesellschaft.)

The ordinary general meeting of shareholders was held at Düsseldorf on Nov. 15,

Mr. W. T. MULVANY, President of Council, in the chair.

The usual preliminaries having been disposed of,

The CHAIRMAN, in directing attention to the most important features of the enterprise previously to the reading of the report, observed that they were only now virtually entering on the trading operations of the company, and this is later than had been anticipated. The main feature of the plan upon which the company was founded was as its name implies, and the extent and class of properties acquired proves—a great coal mining company, with iron works as an adjunct. A prominent result of the completion of this plan, foreseen in devising it, was the mutual advantage to both the coal and iron trades. This advantage consists not merely in reducing the first cost of raw materials at the place of production, but especially in reducing the heavy portion of that cost at the place of consumption—the freight, by enabling the company, hand in hand with the railway companies, to reduce the tariff. Until the company's collieries were ready for trading this main part of the plan could not be entered upon. The Vulkan Iron Works were soon after their purchase quickly repaired, and before even the constitution of the company set partially to work. This had its peculiar advantage in steadily progressing, to obtain a character for the company's iron, and especially in enabling them to cast at the foundry the large quantity of tubbing and other articles required for the colliery, pit sinking, and other work, but otherwise it was rather a reversal of the order of the plan. The collieries having been laid out as to the dimensions of their shafts and workings on the plan adopted for the large output of coal contemplated by this company, and having met with difficulties in the two cases of Hansa and Zollern, from the quantity of water found in the marl (on account of which they had been abandoned by the former companies), have occupied somewhat more time than was originally expected. In the cases of Hansa and Erin, which are now producing coal, as more fully explained in the report of the direction, it was found necessary for the interest of the undertaking, from the lie of the coal beds, and the nature of the stratification, to sink the shafts (all of 14 feet German diameter) deeper than was anticipated before commencing the works, thus also occupying more time than was expected. Nevertheless, in few cases have so many shafts, under such difficulties, and of such dimensions (from 14 to 17 feet German diameter) and depths, been sunk so rapidly, and the collieries brought into production, with their great extent of stone drifts and roads of exploitation underground, in so short a time. Combined with the foregoing causes of delay, has been in the case of Erin and Zollern the unaccountable delay of the Cologn-Minden Railway Company, who after having made strenuous efforts to obtain for themselves, to the exclusion of others, the concession for the public line of railway from Herne to Dortmund, passing by the colliery Erin at Castrop, and Zollern at Kirchlinde, have, as stated in the report, so long deferred the construction of this line, to the mutual disadvantage of both their company and ours.

So much in explanation of the past. As regards the present and future, the facts justify an earnest congratulation. In reference to financial matters, a main feature in the original plan is, with such a large, cheaply acquired, and unincumbered property as they possess, to keep down as much as possible the amount of share capital entitled to dividend, and to obtain the residue required for works and working capital on loans secured by priority obligations on this vast property, now made doubly valuable as a security by the bringing of the works into production. Owing to the pressure in the money market the executive have only partially succeeded in this object, and, therefore, lately called up three additional rates on the placed shares, rather than agree to other and less favourable terms. Besides these three rates the company have still in reserve—50 per cent. on placed shares, 57,486*l.*; share capital not yet given out, 45,360*l.*; residue of priority obligations, 94,950*l.* = 197,796*l.*; a sum far greater than is requisite for the completion of all the undertakings and for trading capital The company have been most fortunate in opening up both the coal and iron mines in finding the most regular formations, the coals of different classes equal to the very best in their qualities as gas, steam, coking, household, and manufacturing coals. The iron ores are excellent, whilst the iron produced at Vulkan, of the different sorts required, has obtained a very high character. The produce of the two collieries, Erin and Hansa, now close upon 500 tons per day, is steadily increasing, and with the due progress of works of exploitation will rapidly increase. The produce of the three blast-furnaces is now 90 tons per day, and will soon reach 100 tons per day. These three establishments are now paying the cost of production, and leave already some profit, whilst in the meantime prices are rising with the extension of railways, steam navigation, and manufactures, consequent upon the confirmed belief in the continuance of European peace, so that with the increase of production during the remainder of the term they anticipate confidently a fair profit in this, the really first year of their trading operations.

The report of the direction was next read; it stated that during the third business year, ending June 30, the exertions of the direction have been addressed to the extension of the works necessary for the exploitation of the collieries—of which two have been brought into coal work—and the further development of the Vulkan Iron Works, where two blast-furnaces were at work during the whole period, but which work can only be said to have been brought into full operation since September, after the close of the business year, by the blowing in of a third furnace, with the necessary engine power, &c., for a large production.

The total quantity of coal produced at the Hansa Colliery up to June 30 was 2852 tons, of which 1678 tons were used for colliery purposes and 1022 tons sold, leaving 152 tons in stock at the commencement of the current business year, at which time the regular coal work may be said to have first commenced, although even then the operations were necessarily confined for the first few months to the preliminary workings in the seam, essential for its effectual ventilation and draining, and it is only in this month that a commencement could be made with the regular coal winning, and the output brought to a moderate quantity which is sufficient to leave a profit on the workings after payment of all expenses.

At the Erin Colliery the land sale was commenced in November last, and in February of this year a beginning was made to supply the coking coal required at the Hütte Vulkan by carting from the colliery to the Castrop station, whence it was forwarded by the Cologne-Minden Railway. The coal is of excellent quality for coking, steam, and general purposes. Since the month of April last the whole supply of coking coal for the Vulkan Iron Works has been delivered from Erin—the screened or lump coal has been tried several times with great satisfaction on a large scale for sea-going steam-ships and for locomotives—and the local demand for land sales is very large all the year round, but especially in the winter half-year. The circumstances of the seams already opened up and proved (not to speak of the great additional number which we know are certainly still to be met with both north and south of the shaft) are such as to provide for an output of 1000 tons per day for many years—the engine-power and other arrangements are suitable for even a much greater output—so that, in fact, the limit of the production will only be fixed by the underground arrangements for hewing and bringing the coal to the shaft. In the sinking of each of the shafts the usual bed of "Bohnerz" iron ore having been met with on the surface of the coal measures, application was made to the mining authorities for two concessions for iron ore, which have since been definitely granted to the company, the concession fields (together about 1000 acres in extent) being so laid out as to cover all the southern portion of the Erin coal field, in which part, if in any, seams of blackband may be expected to be met. The quantity of coal drawn up to June 30, 1869, was 14,667 tons, of which 2760 tons were used for colliery consumption, 11,833 tons sold (including 8216 tons to the iron works of the company at Vulkan), leaving 74 tons in stock at the commencement of the present business year.

With regard to the Zollern Colliery, it appears that the information afforded by the workings at Hansa, which colliery is exactly in the same line of strike as Zollern as to the lie of the coal seams, taken in connection with the borings in the field of Zollern, indicate the most favourable conditions for the coal workings of this colliery.

At the Vulkan Iron Works the daily make of iron with two furnaces had increased already in the month of June to 60 tons per day, and since the third furnace has got to regular full work, about the middle of last month, the average production from the three furnaces has been 90 tons per day. There is no doubt that as soon as the second horizontal blast-engine, now undergoing alteration, shall be available for work, the production can be increased to upwards of 100 tons per day. With this large make, and the saving of fuel consequent upon having an ample supply of blast and of hot-air stoves, the cost of production is sensibly diminished, while on the other hand the selling prices for next year have advanced about 5s. to 6s. per ton, and have thus reached a point at which they are remunerative to the producer, while for the consumer they are still so favourable as could not have been anticipated only a few years ago—being fully 15s. per ton under the selling prices of similar qualities three or four years ago—and even under the then cost of production.

GENERAL REMARKS.—In carrying out the resolution of May 12, 1868, the necessary steps were taken as soon as possible after the purchase-money for Hansa and Zollern properties had been paid to have the title of the company completed, and all the necessary registries made in the "Hypothek" registers, and then to enter a general mortgage upon the property of the company in Hansa, Erin, and Zollern Collieries, and in Vulkan Iron Works, as security for the proposed loan of 180,000*l.*, for which 5 per cent. priority obligations were to be issued, in accordance with the resolution referred to. This general mortgage having been duly registered, was transferred to the "Berliner Handels-Gesellschaft," under a contract deed, Jan. 26, 1869, by which that institution accepts the transfer, to be used for the purposes of the loan only, and undertakes to issue, in conjunction with the company, the 6000 partial obligations of 30*l.* each, which make up the amount of the loan.

The balance-sheet, which will be found in our advertising columns, shows that up to the end of the business year 1868-9, obligations to the amount of 23,490*l.* had been placed, and a further sum of 82,500*l.* had been advanced as a loan on the security of obligations. In the month of July last, however, the obligations were offered to the public, and at present nearly one-half of the whole amount is placed, while the loan raised upon security of obligations has been paid off, with exception of a sum of 30,900*l.* The current business year 1869-70, which will be the fourth since the constitution of the company (in May, 1866) is, in fact, the first of its regular trading operations, there being now for the first time two of its collieries so far advanced in their works of exploitation as to afford an amount of production, which now begins to return a profit over all working and general expenses.

GOVERNOR AND COMPANY OF COPPER MINERS OF ENGLAND.

An extraordinary general Court of proprietors was held at the City Terminus Hotel, on Wednesday, Nov. 17,

Sir R. MACDONALD STEPHENSON (Deputy-Governor) in the chair.

Mr. CHARLES FREWER (the secretary) read the notice convening the meeting. The seal was affixed to the register of proprietors.

The usual preliminaries having been disposed of, the report of the Committee of Consultation was submitted; it contained a recognition of the courtesy the committee had received from the Court of Assistants; from the manager of the works (Mr. Struvé), and from the secretary, and the conclusion to which the committee came was that there surely might be some means of rendering so valuable an establishment available for profitable working, and that in the first instance the Court might act upon some suggestions to be hereafter stated, which possibly would produce so desirable a result before contemplating so serious a measure as winding-up or liquidating the concern. It appeared to the committee that, although for a series of years no dividend had been paid to the proprietors, yet with a property which had cost so moderate a sum as the capital invested in the works at Cwm Avon, and upon which, since the re-organisation of the company, upwards of 62,000*l.* had been expended in new works and improvements, it might, under altered circumstances as to rent and royalties, more economy in working, and improvement in the market for metals, again see the profits of the earlier years of the present company restored, and a degree of prosperity attained that would bear out the expectations of the Court of Assistants, and justify the proprietors in accepting the advice tendered to them in the last report, and thus continue to work the establishment at once with advantage to themselves and the numerous families and persons employed at the works. The committee concluded by offering a series of suggestions to which the Court of Assistants reply in a special report.

The report of the Court of Assistants discusses the several questions raised by the committee, and there appears to be a general disposition to adopt the suggestions. As to reducing the expenses of the London office, it is shown that at the present moment no reduction could be made with advantage, but as opportunities occur they will, as heretofore, be taken advantage of. The suggestion whether the expenses of the establishment at Cwm Avon can be diminished is reported upon by Mr. Struvé, who states that he has effected economies equivalent to 700*l.* per annum, and he is always on the watch to take advantage of any circumstance that may arise to get rid of expense, and he is constantly doing something in that direction. As to the suggestion whether the works' manager should not be brought into closer union with the board, a decision had previously been arrived at by the Court that a more frequent attendance of the works' manager in London would be advantageous; but it would not be desirable to have fixed periods for his coming, and they would give him notice whenever they might require his attendance. Referring to the suggestion whether it might not be beneficial to consult an experienced and practical person or persons who could carefully examine the present mode of working in the different manufacturing departments of the works at Cwm Avon, with a view, if practicable, to greater economy, and a cheaper cost of production of any article of manufacture, the Court are gratified to observe that the committee have, in this suggestion, also directed attention to possible improvements which the Court have had under their serious consideration for some time past, and which are referred to elsewhere. On the point relating to the number of the Court of Assistants, and the remuneration to be paid to them, the committee suggest the reduction of the number of assistants to the statutory minimum, and that the annual remuneration should not exceed 1500*l.* It will be remembered that at the last annual court the Court of Assistants made a proposition which differs but slightly from this suggestion, and they have now only to add that the question is one for the consideration and decision of the proprietors, and that in whatever may be decided they will cheerfully concur.

The CHAIRMAN said—The death of your esteemed and excellent Governor will have been deeply and sincerely felt by all who had the privilege of knowing him, and by no one more than myself on the present occasion, when called upon to undertake a duty which he would have much more efficiently performed had he been still among us. The object of the meeting is to consider the report of the committee appointed in April last to examine, in concert with the Court of Assistants, the present state and prospects of the undertaking. This report is now before you, with that of the Court of Assistants, embodying the views and opinions to which the enquiry has led as to the most advisable course to be pursued to restore, at least in some degree, the prosperity of earlier days. The suggestions of the committee and the action proposed to be taken by the Court are so fully explained in the report that it will not be necessary to occupy your time by any recapitulation of them. They may, however, be very concisely epitomised. The object defined by the committee is "to give the concern a chance of working to a profit." The means to this end contemplated by the Court are to obtain independent and disinterested opinions on the present practice, and its possible improvement; more effective subordinate supervision of each department of manufacture, reduced cost of production, and such increased vigilance on the part of the Court, through the committees, as shall afford a continuous check to that expenditure which in all large establishments is so apt to increase and extend, and so difficult to restrict. These, in few words, embrace the practical result of your desired enquiry, and, if steadily and perseveringly pursued in a right spirit, there is every reason to expect that they will materially tend to effect the great desideratum of realising a fair and reasonable return for the money invested in the preference capital of the company. A manufacturing establishment depends for its success less upon an occasional large reduction of a particular item of expenditure than upon the unceasing watchfulness of all the small charges constituting collectively the cost of the finished articles. They furnish the key to prosperity or failure, as they are observed or disregarded. In my remarks I desire not to be misunderstood as implying any neglect on the part of anyone connected with the company. I am sure that all have done their best to promote the interests of the undertaking; but the undertaking does not thrive, and it is evident that more vigorous measures must be at once adopted to effect the desired change. If the works can be carried on at a profit, no reasonable man would wish to close them; but if they cannot be worked to yield some return upon the capital it would be neither reasonable nor just to perpetuate such a state of things. Sudden and hasty action on such questions can be attended only with disastrous consequences; but the steady carrying out of a well-digested system of improvement and economy such as is now proposed will meet all the requirements of the case—and, in their endeavours to give effect to them, the proprietors may rest assured that the Court will spare no exertions to bring about the desired result of, in the words of the committee, "giving the concern a chance of working to a profit." On the subject of Port Talbot Harbour and the railway to the coal districts, the Court hope to be able to make a communication at the next annual meeting of the proprietors. I shall not trespass longer upon your time than to state that the Court are ready to reply to any questions, and to afford any further information required, and I, therefore, propose "That the report of the consultation committee, and the special report of the Court of Assistants, embodying the views of the committee, and the Court's recommendation thereon, now read, be approved and adopted, and that the Court of Assistants be requested to adopt such measures as they may deem necessary to give effect to their views."——The resolution was seconded by Mr. HARMAN.

After some questions by Mr. CURLING and Mr. MONTRESOR, as to no reference being made to a reported rise in iron, and on the desirableness of circulating fuller reports of the meetings, in the latter of which the Chairman entirely concurred, and stated would be acted upon, Major STEWART stated that he was not in a position to consider the report, because the accounts were not sufficiently full—they were ridiculous, as they did not distinguish the costs of working the several branches of manufacture in iron, copper, and tin; the cost of iron purchased, royalty paid, &c. He thought the property was freehold, and no royalty paid, which only shows that the proprietors are kept in the dark. Again, he thought a divided authority existed in having a manager at the works and one in London, and must entail more or less loss. Mr. Frewer's salary had been raised, too, when trade was depreciated. He had no wish to reduce it, and did not think that would make much difference in regard to giving a profit. There were great losses about three years ago—in 1862-63—about 25,000*l.*, was it from purchases or sales, or what was the cause? and the gain for 1864 of 40,000*l.*, so that but for the previous losses a good profit should have been made that year. Losses have been made also in the subsequent years, but the details in the accounts are not full enough to explain how and why they have occurred. The Court say they have for some years had remedial measures under consideration, but they have done nothing until this committee was proposed. The French say "*qui s'excuse s'accuse*," but I cannot exonerate the directors, who are bound to give their whole energies to the work, and not wait until improvements are forced on them. Again, fuller reports should be given for the benefit of absentees of what takes place here. He had no doubt the works would go on well under Mr. Struvé's care, but if he is counteracted in London he wastes his energies altogether. He should not oppose the resolution, especially as the Court promised energy in the management. He thought the concern could be profitably carried on, and that there was no necessity to wind it up.

Mr. BEATTIE could not assent to the resolution. The Court appeared to have failed to meet what he and the committee deemed the most important part of the business, in placing on the manager of the works a degree of responsibility and influence co-ordinate with that of the Court to prevent anything like a divided management. There must be some one whose energies are devoted to keep together such an enormous number of workmen as we employ. Could this be done by a London board? There appears to be a London manager as well as one at the works. How can they work harmoniously? It is not in the nature of things. Only office business should be conducted in London. The man who smelts the ores should purchase them, or be cognisant of such purchases. The Court appear to have considered the leases in 1866, and to have obtained recently some improved terms. Then, again, how do the Court deal with the London office expenses? They ask their secretary what is to be done to reduce them. The hon. proprietor then gave a statement of the charges for the several preceding years, showing that in 1861 they were 1386*l.* 15s. 2d., and amounted last year to 1917*l.* The probable reduction at the works is properly treated by Mr. Struvé, who says that he has earnestly endeavoured in the last two or three years to reduce expenses, and successfully, in the collieries, by 700*l.* a year, and also in other departments, but he cannot dispense with any of the clerks or agents. He is always on the watch to reduce expense, and constantly doing something in that direction. That is to the purpose, and what we want, and that I understand Mr. Struvé is willing to do. Again, what does the Court, on our recommendation that Mr. Struvé should be brought into closer union with the board, and greater responsibility rest on him? Why should not Mr. Struvé be part of themselves?

Major STEWART considered that Mr. Struvé should be the head.

Mr. BEATTIE continued, and compared the time when Mr. Gilbertson, the former manager, was one of the board, and he considered that the works' manager should be part and parcel of the board. The Court admit the advantage of Mr. Struvé's attendance at the board when they require it, and how often have they so required it? He would ask Mr. Struvé how often?—Mr. STRUVE thought it was twice since May last year.

Admiral BOSANQUET thought Mr. Struvé might be asked whether he considered that he could advantageously have been called up oftener?——Mr. BEATTIE resumed, and drew attention to the proposal to consult practical persons, who could examine and report upon the mode of working, &c. The committee did this, not from want of confidence in Mr. Struvé, but because the experience obtained in other iron districts and mode of working might be useful.

Major STEWART thought the persons should not be appointed by the directors but by the proprietors,——Mr. BEATTIE thought the appointment should be an act of harmonious action between Mr. Struvé and whoever is appointed; it should not be somebody to come and pry about. Then, the Court propose to appoint sub-managers. Are there not already sub-managers?—Mr. STRUVE: Yes.

Mr. BEATTIE would ask whether the Court's proposal was a right thing to do? The works' manager, he thought, should have more responsibility thrown on him. Instead of which the Court propose to send down one or more sub-managers, and, in fact, to make Mr. Struvé of no use at all, but simply to keep paying him his salary, and send other people down to do his work. It is clear you cannot go on as you have been. I desire to avoid breaking up the company. If the suggestions of the committee are carried out in a harmonious spirit we can go on, but thinking the course proposed by the Court not good I cannot support the resolution.

Mr. HENDERSON was disappointed alike with the reports of the committee and the Court. After years of difficulty and struggles there is no interest paid on the preference capital. He expected the committee would have furnished the key, and suggested the remedy, and show whether it was preferable to wind-up or carry on the works, with the reasons. He was disappointed with the committee's report, and would ask whether any dead weight existed to indicate a hopeless condition?——The CHAIRMAN: Certainly not.——Mr. HENDERSON: We should do as is done by commercial houses, who only continue their trade so long as they can make it prosperous.

Mr. FREEMAN enquired as to the leases and royalties paid under them?——Mr. WAITE thought it desirable to go on some time longer, and give the concern a chance; and as he heard of difficulties arising from divided management—whether truly or not he could not say—if the Court would put Mr. Struvé on the board, it would remove the difficulty. He had, however, such confidence in the directors, that he should wish to leave the matter in their hands, and hoped they would concur on that point.——Mr. FOX would have more responsibility placed upon Mr. Struvé, but would like to know if there were any inherent cause of weakness in the concern to prevent its reaping the benefit of improvements in the iron trade, in which case it would certainly not be desirable to carry it on.——Mr. BEATTIE stated that before proposing an amendment to the resolution of the Court, he wished to hear the views of other proprietors, and to say that in proposing it his object was not hostility.——SEVERAL PROPRIETORS: That is not our object at all.——Mr. BEATTIE then proposed as an amendment—"That the report be received, and that it be referred back to the consultation committee, to consider how far the suggestions of the report can be carried out or modified." The amendment was seconded by Major STEWART.

Mr. W. HAWES would not refer back to the committee, whose report evinced an utter absence of what was required. He would rather rely upon the directors. Little good could arise from further reference to consultation, while it would stop the proceedings of the Court, and weaken their influence at the works. Mr. Struvé should have more defined authority, but it would be most injudicious to hamper the Court in the exercise of their discretion.

The CHAIRMAN: Before putting the amendment which has been proposed by Mr. Beattie, and seconded by Major Stewart, I shall ask your permission to make a few remarks, in justice to the Court. Major Stewart complains of being kept in the dark in regard to details he would like to be informed of This is a statement which I will never permit to pass without a distinct contradiction, as regards this and any undertaking with which I am connected. As regards the accounts, they are made up with all the care possible, and approved by auditors of character and experience; but it is desirable that any proprietor desiring more detailed information should, before denouncing what he does not understand, call at the office, where every particular can be examined and explained. With reference to the alleged divided authority, he (the Chairman) was not aware of its existence. He believed one secret of success to lie in the judicious division of labour, which was one object aimed at by the Court. It was said that Mr. Struvé's labour should not be counteracted in London; he was surprised at such a remark, as whatever was done had been invariably in cordial concurrence with Mr. Struvé. Of the secretary's salary, he stated from personal knowledge that the proprietors could have no one more devoted to the interests of the company, or better fitted for his post, than Mr. Frewer, and that his salary was certainly not more than, from his services, he was entitled to. As to publishing the details of the cost of materials, and other similar items of the business, it would be most prejudicial, as furnishing such information to others than proprietors. As regards the reduction of expenses in London and at the works, the Court, of course, referred the question to the heads of each department; but the Court by no means endorsed the opinions of either, that they could not carry reduction further. It was one of those questions into which the Court intended to examine and judge for themselves, one of the main objects of the Court's proposal of re-organisation being directed to this end. With respect to the proposed appointment of sub-managers, there were none at present, the heads of departments being working foremen; but, whether right or wrong, these were questions which should be left to the discretion of those who undertook the responsibility of conducting the company's affairs. As regards Mr. Struvé's attendance at the board, the Court should exercise their discretion as to when and on what subjects they required his attendance. The Court duly appreciated Mr. Struvé's usefulness, but if the proprietors decided to place Mr. Struvé at the head of the concern they could scarcely require the continuance of the Court at all. That was a matter which rested with themselves to determine. The assumption that the Court might send down persons to pry into the works when selecting the men from whom they proposed to obtain reports of the working is not just to the Court, when they are devising the best means in their power to make the works prosperous; and as regards consulting Mr. Struvé's feelings on the subject, they have always been and will be consulted except where they come in conflict with the interests of the proprietary, and then they must necessarily be set aside.

The CHAIRMAN reminded the meeting of the quadruped which, from the divided counsels, was tumbled over the bridge. Suggestions had been made about Mr. Struvé being placed on the Court. Did the proprietors really think that Mr. Struvé could manage those works, probably the largest in the world, having regard to their varied operations in iron, tin, and copper, and also attend at the boards? He would say nothing of the implied incompetency of the Court to perform those duties which Mr. Struvé is proposed to be employed to manage and supervise. If such were the view of the meeting, he should at once put the amendment, distinctly informing the proprietors that they must choose between one of two things. If they liked among themselves to settle what course the Court should pursue, and what they should not do, they had better take the concern into their own hands, and relieve the Court of a responsibility which they would readily resign, but which they certainly would not undertake unless they possessed the full confidence of the proprietors, and exercised their discretion in the matter. The undertaking was, and had long been, in a most unsatisfactory state. He (the Chairman) had agreed to join it only in the hope of being enabled to improve it.

In reply to Major STEWART, who considered that there were many proprietors who could manage as well as the present Court, the CHAIRMAN intimated his entire concurrence in the belief that there probably were many such competent men among the proprietary, adding that if they would come forward and take the management in hand he (the Chairman), and he was sure his colleagues also, would be ready at once to make way for them; but so long as the proprietors held the Court responsible for the conduct of the concern they must give the Court a proper discretion, or they could not reasonably expect them to undertake the responsibility.

Mr. HARMAN: I have very few words to say, but as I have seen a good deal

of the working of the concern, and as I am, with the exception of one gentleman, the oldest member of the board, perhaps I may be allowed to make one or two remarks. With reference to the honourable proprietor, Major Stewart, his objections seemed to be confined to the management of the business, and to rest entirely upon the Court, and he stated that the Court had neglected their duty. Now, I beg distinctly to deny that. I can most conscientiously say no board of directors have done their duty (to the best of their ability certainly) better than this Court. That I say most conscientiously. Then as to being kept in the dark with regard to the accounts, I must say the honourable proprietor spoke with complete ignorance (if he will allow me to say so) of what he was talking about. It has been a long time known that all the proprietors have perfect liberty to come to the office and ascertain all the particulars with regard to the price of the goods, and every detail. That is well known. There is a great objection to putting these details in print, but those who are interested in those matters have a full opportunity of seeing them. The most important observation was one made by our excellent and able auditor, Mr. Beattie, and I own I was surprised, after the number of years that he has been aware of the way the concern has been conducted, that he should say what he did. He seems to speak from an entire misapprehension as to how the thing is done, and what is done —that is, what the management of the board is, and what is done at the works. The observations seemed to centre entirely upon Mr. Struvé, the manager of the works, being called into more frequent communication. With regard to the present mode of managing the works, let me call the attention of the proprietors to the scheme as it was originally proposed. It was proposed by a man than whom there is not a more able one, I mean Mr. Gilbertson, and by one of our former and much lamented Governors—Sir Henry Pelly; and the proposal was that the manager should be at the works, and at no other place. The practice accordingly was that Mr. Gilbertson should be entirely there, and he had nothing to do with the sales in London. Then with regard to the purchase of copper ore in those days the trade was in a different position. It was a monopoly of the smelters, and each house had its purchase, and it was a matter of course that each house received its own share. The present state of the trade has rendered it necessary to alter the mode of purchasing copper ore; it must now be done in London, and it is out of the question that it can be done at the works. The manager, according to the present mode of working, is to be down at the works, and his attention is to be solely directed to what is under his charge. Then with regard to the expenses, to which Mr. Beattie has alluded, I think he must have forgotten that the increased expenses arose from an alteration in the management, in consequence of the retirement of the late salesman, who bore a share of the office expenses. The other increased items can be explained by an increase of interest three years ago—everybody knows that. Then with regard to the question of placing the whole management of this great concern in the hands of Mr. Struvé, or any manager of the works, as long as I am a proprietor, whether I sit at the board, or whether I am one of the general body of proprietors, I should oppose it distinctly: I think it would be a most unwise policy. However, if the proprietors think differently I am quite prepared to retire from my seat here. Then generally as to the directors, I quite agree with Major Stewart, in saying that there may be twelve gentlemen on that side of the room who are quite as capable as ourselves to manage the concern, and all I can say is that I should be delighted to resign my seat to anyone willing to take it.

In reply to Mr. STEWART, as to a statement of Mr. Gilbertson, that the works had been visited in former times only by one or two of the Court, the Chairman directed attention to the paragraph in the Court's report, which had especial reference to more frequent personal inspection by members of the Court at the works.

Mr. R. B. WADE: I will ask the meeting to allow me to trespass on their time for a very few minutes. The different objections from that side of the table have been replied to, whether satisfactorily or not it is not for me to say from this side of the table, but I wanted to reply to what seems to me to be rather the feeling of the proprietors—that is, that the directors in this concern have a sort of natural feeling to keep the concern on, when it is apparent that there is not much hope of it becoming remunerative.

SEVERAL PROPRIETORS: No, no.

Mr. WADE: I am glad to hear, gentlemen, that that is not your view, and I am sure it is not the view of the Court. I can assure you that we have discussed the question of liquidation or of winding up. I can assure the proprietors that that question has not been ignored by us, but we have discussed it to see whether it would be more for the interest of the proprietors to wind up rather than to struggle on in the hope of a better state of things. Of course, we feel the present state of things even more than you do. We are proprietors, as you are, but we have the additional annoyance of attempting to bring the concern into a beneficial state, so as not to have to meet you with the same story year by year that we have no dividend to give. I was in hopes the resolution proposed by the Governor would be accepted. The great point, if I am right, between Mr. Beattie and the Court at the present moment is the appointment of Mr. Struvé as managing director, to act on the board. I believe that it is the great wish of Mr. Beattie and Mr. Waite. If the amendment is put and carried, of course, that would put the Court, as we have strong views on the question, in an awkward position. We have discussed the point, and though, of course, we may be wrong, as it is a matter of opinion, we think as a matter of principle the manager ought not to sit on the board. Gentlemen, I need not say that we do not undervalue Mr. Struvé's qualifications, or that we should not feel pleasure in being associated with him individually, because I have no hesitation in saying that I do not know a more intelligent manager who could sit on any board, because his information and his experience are so great and varied that he would bring to bear an authority of a very valuable character. The objection, however, to the manager sitting on the board is, I think, this—that if he sits on the board he no longer is subservient to the board. My theory is, if you put the manager on the board you decrease his responsibility, and ours, too; therefore, I should have hoped that Mr. Beattie would not have pressed the amendment, but that we should have been able to agree to pass the resolution as it is put from the chair, and then wait until the next meeting, so as to give the board the opportunity of trying to do what we can to bring the property of the company into a better condition. I need not assure you that the various subjects mentioned to-day, and the opinions expressed by the proprietors, will not be lost upon us; they will receive the consideration which is due to them. They come from gentlemen who, of course, are suffering from the loss of income and property in the concern, and they would have very great weight with us. It does seem to me that you will, by the amendment, prevent us giving them a full consideration, and that you paralyse our endeavours if you do agree to the amendment. We have met the gentlemen who formed the committee of consultation. Their opinions and our opinions are written in the report. We are responsible at the present moment to you for the concern, but, if we are to act with the committee again, it seems to me that responsibility is to a certain extent taken away, for then we could not carry out anything without the consent or approbation of, or without a consultation with, the committee. A gentleman at the other end of the room has said that he does not think that any good can come from it, and, therefore, I should have been glad if you had accepted the resolution as it was originally put from the chair. I must now apologise for troubling the meeting.

Mr. BEATTIE: One moment, Sir. My object was to put the amendment in the most acceptable way to yourselves. If the gentlemen at this end of the room think we have done quite enough, I can assure them we have a deal of anxiety in doing what we have done, and I should be very glad if our friends would set us free. But I have put it in that way, hoping it would be more acceptable to the Court. If you put your resolution, Sir, we can then say yes or no to it, and then I am quite willing to withdraw my amendment, with the consent of the seconder. I just want to set my friend Mr. Harman right as to the comparison of the expenses of the London office. I understood Mr. Harman to say that they were increased by interest. Now, I expressly excluded interest from the London office expenses. Then, that you might not think I wished to do anything unfair, I abstained from saying that at the time Mr. Pulling ceased to be the manager, you had increased the salary of the secretary 200*l.* a year, which I did not take into the account at all, in order that the London expenses proper might be taken into account alone.

After explanation by Mr. WADE that the great point upon the matter of principle involved was as to the manager of the works being made virtually the managing director at the board, which was regarded by the Court as an anomaly, Mr. WAITE thought the discussion had been useful. It showed the feelings of the proprietors, and he thought Mr. Beattie might withdraw his amendment, which was eventually done.

The CHAIRMAN considered that in the withdrawal of the amendment Mr. Beattie had exercised a very wise and sound discretion. He must be aware that at a public meeting of shareholders there are many matters, especially where personal questions are involved, which cannot with advantage to the general interests be brought under discussion. Were it otherwise, he should probably be able to add much to what he had only briefly touched upon previously.

The CHAIRMAN then put the original resolution, viz.—"That the report of the consultation committee, and the special report of the Court of Assistants, embodying the views of the committee, and the Court's recommendation thereon, now read, be approved and adopted, and that the Court of Assistants be requested to adopt such measures as they may deem necessary to give effect to their views," which was carried.

Mr. BEATTIE then proposed, and Major STEWART seconded the following resolution, which was carried unanimously—"That the convening of any special general Court for the purpose of filling any vacancy which may occur in the Court of Assistants shall not be required until the members of the Court of Assistants shall have become reduced below the statutory minimum; and that, until further resolved, the remuneration of the Court of Assistants be fixed at 1500*l.* per annum."

The proceedings terminated with a vote of thanks to the Chairman, the Court of Assistants, and the committee.

[For remainder of Meetings see to-day's Journal.]

"THE SCIENCE OF INVESTMENT."—Under this title an ably written and very interesting pamphlet has just been issued by Messrs. Tredinnick and Co., of Threadneedle-street, which will prove of considerable value to investors. The authors very truly state that to make the most of investment there must be no sloth, no inertness. The investor must inform himself, and act from time to time without that *dolce far niente* which lolls supinely upon money bestowed by fortune. Money must not be buried like the talent, which, having been deposited in the earth, was dug up and found the same as it was buried. Apart from personal gain, there is a responsibility in the possession of wealth which should be recognised by the gifted minority. The authors very truly remark that it is far more easy to detect those concerns and undertakings that will not, and do not, pay, or are not, and will not prove, worthy the attention of the investing public than it is to point out and distinguish with unerring certainty those securities which do, and will continue to, yield remunerative rates of interest at present and over a series of years; and, moreover, possess those elements essential to prospective growth and permanent success, yet free from those risks, which, with rare exception, accompany the trading and commercial interests of this speculative and enterprising age, and which at times must necessarily set at naught the calculations of the most earnest and jealous supervision of the highest authorities, even when their conclusions are founded upon the closest analysis of the most unquestionable data, aided by the calmest judgment, added to long experience and practical acquaintance with monetary affairs. Messrs. Tredinnick and Co. offer to supply any information and assistance that may be required by those who consult them upon application, not only in forming an accurate estimate of that which they may possess, but also to direct them aright in the selection of those securities that will, in their judgment, constitute profitable media for future employment of capital.

LONDON GENERAL OMNIBUS COMPANY.—The traffic receipts for the week ending Nov. 21 was 8821*l.* 10s. 9d.

The Royal School of Mines, Jermyn Street.

MR. WARINGTON SMYTH'S LECTURES.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE IV. *(Continued).*—Mr. SMYTH, pursuing his disquisition upon the filling of veins, said—As a rule, it must be always remembered that the lode stuff or vein stone, containing tin, or silver, or gold, or other of the more valuable metals, has in it a much larger proportion of valueless material, in some parts of which the metals are disseminated. The other parts yielding nothing are called by the miners "dead" (German, "todtstein)." As soon, however, as upon examination these portions of a vein begin to show specks of traces of ore, they are said to be "alive." Sometimes these will be found in a vein, masses of the rock of the country, the most accepted hypothesis respecting which is that before the veins were filled in with metallic and orey mixtures a second subterranean movement has taken place, and pieces of the adjoining rocks broken off or thrown down, reducing the width of the vein in those places, while in others the vein is left of its original magnitude. If we follow out the places where the ore is deposited we shall find that it often assumes a great variety of forms. Sometimes the metallic deposit—as, for instance, that of tin—is disseminated pretty equally throughout, and thus the vein is worth working from side to side, and if the width is not excessive this is a great advantage. In other mines the metallic riches are restricted to lines or zones, or are of irregular forms, lying in different parts of the lode. In the Levant Copper Mine, at the extreme West of Cornwall, in which the workings pass out to a considerable distance beneath the bed of the Atlantic Ocean (which is too near to be quite pleasant, a good deal of water finding its way down, and causing not only much trouble, but anxiety as to what may be the ultimate result), it will be seen by the large map on the wall that the ore lies in irregular patches. Galleries have been driven to great distances upon the vein without finding ore, but it has been found that the best results have always been when the slatey rock overlies the granite. And as with the copper so with the tin, which is obtained from the lower part of the mine. You will see that there are three great patches, respectively about 60, 80, and 100 fms. in extent, of entirely dead ground, and yet the owners persevered in cutting through them, although they had to pay 10*l.* or 12*l.* a fathom for driving these long levels, until they came to orey deposits of great value, which lay awaiting them in large masses called "bunches," rather than in "courses" of ore. Deposits of this kind occasionally extend downwards, when they are called "pipes of ore," and in some districts this formation is very remarkable. Thus, it must be left to the judgment and powers of observation possessed by the manager to decide in what direction advance ought to be made, and money expended upon dead work. There are abundant instances of great waste of money both in sinking and in horizontal workings; and, therefore, the manager should lose no opportunity of extending his information, or of investigating what is actually found in the deep. The prosecution of these undersea mines naturally involved certain difficulties. A glance at the map will show that as those levels which go inland made any considerable progress, and new masses of orey ground were reached, fresh shafts had to be sunk; but underneath the sea any such shafts would be impossible. The miners have, therefore, given the shaft nearest the sea-board a diagonal or inclined direction; and it has frequently occurred under other circumstances that inclined shafts have been sunk. Indeed, in the metalliferous districts following the lode with the shaft is by no means uncommon. Thus, at St. Just several mines go down on the underlie with an inclined shaft. I have said that ores are sometimes found in bunches and in pipes, and I ought not to omit to mention that there are two or three districts in which formations of this sort have a very evident connection with particular rocks. In some of the mines of the Tyrol, for instance, a succession of rich pipes of ore occur, and have received the somewhat lengthy designation of "adelsvorshut." I could also mention many places where the shaft is sunk on the vein, and the workings so managed that the dead ground on either side is not touched at all; but the general state of things, and that, too, in mines which yield large profits, and which are opened out to great depths, shows us that, perhaps, half the area has not been productive. With regard to structure, there are large portions of some of the great veins in which the filling is in a most mingled and confused condition. In this way metalliferous minerals are disseminated through it, as in the "capel" I have mentioned; and it is only when they approach in some degree a regular structure that the lodes yield galena, copper, and other ores in large masses. The ores, however, more frequently occur in a dradgy or, as they say in the North of England, a "brangled" form, and associated with calcareous spar, fluor spar, iron pyrites, &c. Structures of this kind are often called a "banded" or "ribbon" structure; and in Derbyshire and the North of England are of great beauty and interest. Sometimes the structure is called "brecciated," a term applied by geologists to rocks in which a quantity of angular fragments have been bound up together in a sort of paste, as it were, and hardened into a solid mass. I do not know anything more suggestive as to what has taken place in the filling of veins. These angular fragments, the fracture of which is often as sharp as if only just effected, have evidently been broken up after the opening of the lodes, and then became consolidated in them by the cementing material in a fluid state. In Cardiganshire the fragments are composed of the black slatey rock of the country, and they are embedded in a material in which carbonates of iron and of lime predominate. The cementing material is sometimes non-metallic and sometimes metallic, and in the latter case may be the valuable part of the lode. [Mr. Smyth concluded by exhibiting some remarkable specimens of brecciated minerals, in which the fragments were cemented together in one case by oxide of tin, and in another by witherite or carbonate of barytes.]

LECTURE V.—We have now examined mineral veins or lodes with reference to the character of each taken independently of the others. We have had before us what we should observe if we could be admitted to every part of the lode, and see it opened out to us foot by foot. We must now go a little further, and consider what happens to the lode, either horizontally or in depth, affecting its extension. Supposing, then, we understand its ordinary variations of appearance, and how after having been occasionally met with of enormous thickness it changes to mere strings scarcely noticeable in the rock, or a small thread containing metallic matter more or less disseminated through it, and sometimes approximating so closely to it as to require the exercise of all our skill before we can decide whether there is a vein or not. Then, from these extremely small dimensions, the same vein may be followed out to a great breadth between its walls, amounting to, in some cases, from 30 ft. to 50 ft., and in those which include bands of country rock from 120 ft. to 180 ft. Then, I have very slightly touched on the theoretical questions as to how the minerals have been brought to the veins in which they are found. I have not given importance to any particular hypothesis, because the miner has to take these things as they are, and he will find plenty of occupation in looking at the physical condition of veins as they exist, and in considering how they best can be worked. When, however, we come to regard the probable depths to which veins will yield ore, we shall find that theory may render us useful service, and enable us to conclude with more certainty than otherwise on that point. While generally we have the minerals in veins mixed very confusedly and in various conditions, those which contain metallic ores most exhibit crystallisation, which frequently takes the most beautiful forms conceivable, and shows many chemical combinations. Whether the substances have been crystallised by sublimation or igneous fusion may be a matter of opinion, but we shall also find a great quantity of the minerals evidently placed where they are by mechanical agencies, and showing marks of attrition produced by large bodies of rock moved by subterranean pressure. In some districts ribbon or platted lodes, having parallel bands of different material, are found, some distinctly laid on the others, and some intermingled at the junction. Some of the clear spaces found in veins show the mode in which crystals are formed attached to the side, and crystallised towards the hollow within. Sometimes the narrow spaces between the points of the crystals are filled with some variety of oxide of iron or fine silt, and sometimes even sand may be met with, to show still more clearly that these have been formed in hollow spaces. Large caverns, or cavities, are sometimes found with the interior lined with masses of crystal, while all the material about them are of a different kind. One of the most remarkable of these was discovered some years ago at Dolcoath. It was many fathoms in height and length, and many feet wide. I happened to be at the Devon Consols when one of these cavities were found there, and examined it thoroughly. When a miner has bargained to drive a level at a certain price, and cuts into one of these spaces, he is considered very fortunate, and makes a good bunch of wages; and it is also reckoned good for the owners, as the vein generally improves in such neighbourhoods. Nothing is more beautiful than one of these subterranean caverns. It is brilliant with a coating like films of thin ice, and the floor is strewn with shining fragments which have fallen from above. Sometimes there are stalactites, not merely of carbonate of lime, but in the most beautiful forms of iron pyrites. This is quite sufficient to indicate that the material on the side of a vein has been formed by crystallisation, that these unusually wide spaces have been hollow for centuries, and where they are filled up it is by a material of more recent periods, as, for instance, silt. Cases of this kind are striking in districts permeated by large volumes of water, as Derbyshire and Flintshire, where on being cut into these places are generally full of silt, and in one case, at the depth of 90 fms., the trunk of a tree was found.

I have mentioned these preliminary points to remind you of the fact that even in their best moods the veins are subject to very great changes—from extreme richness to great poverty, so that the miner has often to drive through many fathoms of dead ground in the hope that the vein will recover its value. If we look at the map on the wall of the Carn Brea Mine we shall see that the lode extends laterally over a distance of 30 or 40 fms., which may be considered a good length, but suppose we have a large district to work over it will be a question whether we ought to be satisfied with that. This will depend a good deal on what is known of the district. Where veins are small, and cannot be traced more than a few fathoms in length, it would be unwise to go too far; but in Cornwall, in Prussia, in Germany, in Saxony, and in the Hartz, the length and composition of the veins are thoroughly understood. In those countries, therefore, an experienced miner, when he finds that he no longer obtains any ore, would be able to form a correct judgment whether or not he ought to give up. A great number of disappointments and checks have been experienced for want of a proper appreciation of the facts I have laid before you respecting the nature and true character of lodes. There is an idea that the same regularity ought to prevail in lodes as that which characterises bedded deposits; and until that notion is got rid of disappointments will be certain to follow. As regards the extension of lodes, either horizontally or vertically, there is no *a priori* rule as to the probable future yield of ore. There are, however, indications from which we may derive assistance. If it is a case in which the extension must be horizontal, we must expect to find some limit to the patience and perseverance of an adventurer. If we drive for a long distance without any profitable result, and if the orey portions have come to an end, it is well to discover actually under what circumstances. Sometimes a lode comes to an end against a change of rock or ground. It may come against a rock of a different character to that which it previously intersected, and which may be subsequent in date to the formation of the vein itself. Thus, if we come to a mass of greenstone of a protruded character, we cannot expect to penetrate into it with advantage. Sometimes a vein disappears gradually, and is said to "die" away into the country, and then it is pronounced too poor to follow. This verdict may be very unsatisfactory, and in such cases there should always be a close examination before it is abandoned. Lodes, as I have already pointed out, are of exceedingly variable breadths, and may even narrow down until they become so small as to be lost, or they may break out into small sets of threads and strings, none of which separately would be capable of paying expenses. This is an extremely frequent circumstance, and the miners must be guided by the average bearing of true lodes as to whether these strings will come together again. The examples furnished by actual mines as to how lodes are to be followed vary considerably. In Cornwall individual lodes have not been traced more than from one to two miles. The celebrated lode of the Wheal Fortune, at the end of 1¼ mile, broke up into mere strings. Others may be traced (like the Devon Consols at its western extremity) in poor strings to a distance of three miles. In the case of some of the lodes in Wales, a country valuable for mining students on account of the great variety of lodes traceable with facility over its wild and open hills, range in length from one to four or five miles. The great copper lode of Pyrilimmon has been traced for nine miles. At the Clausthal Mine, and generally on the south-west side of the Hartz, the lodes are often as long as 4½ miles, some of them, as mentioned before, being of considerable breadth. In Saxony, where the lodes are more like those of our English districts, they are from one to seven miles in length. In Hungary the silver and gold lodes of Schemnitz have been traced from four to five miles, though there are many shorter ones. Amongst lodes everywhere there will often be one which, from its size and character, may be expected to maintain itself over a large line of country, and it is then called in England the "master" or "champion" lode. In some more distant countries lodes have been traced over much greater distances, and are frequently said to be from 20 to 30 miles in length, but it is not wise to accept too readily the idea of a single fissure extending so far. A series of fissures may be understood, but it is by no means frequent for a single fissure to be traceable to these great distances. The workings of a single mine seldom extend beyond a mile in length, and they are often, from peculiarities of mining laws and other reasons, limited to 200 or 300 yards.

And now comes another and a most interesting question—How far down are we in any given case to expect the lodes to extend? In determining this problem local evidence may be useful, but it is necessary to guard against a great deal of fancy and prejudice as to surface appearances. What I have shown you as to horizontal workings—alternations, that is, in the veins of poverty and wealth—so will it be found in the depth. If we follow a lode downwards we shall find as much variety and uncertainty as in other directions. Sometimes there will be riches, sometimes poverty; now it will be vertical, and then perchance almost flat; sometimes broad and abundant, and then pinched and poor. Referring, again, by way of example, to the deep copper mine at Tresavean, you will see by the map that the ordinary width of the lode is from 4 to 5 feet, but occasionally it becomes very narrow, then widens out again, until at its lowest depth (340 fms. from surface) it is at its best breadth, and offers no indications of giving out. In 1857, however, the deeper workings had to be abandoned, and the subterranean waters let in. This arose not because the lode had grown too poor in comparison with what it had been before, but because the extreme depth had so increased the expenses that at the present prices of metals it no longer yielded any profit, but, on the contrary, involved considerable loss. The time, however, may come when better prices may be obtained, and the cost of working cheapened, so that the water will be pumped out, and the scene of so many great successes, and, no doubt, occasionally of disappointments, will once more be placed in a state of activity. The experience of this lode may be said to be that of all regular lodes. There are courses of ore which are very profitable; then comes a bar of poor ground, which is worked at a loss; then, after a time, comes a fresh course of ore, and so on, a process which may be repeated three or four times over. The small water-wheels, and the inferior machinery of the old miners, prevented them from descending to any great depths, and many of their workings have been re-opened with great advantage in modern times. When we see that capel has been found to contain tin, although it was formerly regarded as utterly useless, it is more than probable that many old mines were given up on reaching any large masses of that substance. Who shall say that those tin veins may not be opened again with great profit and advantage? Who shall say in any case that at a few fathoms lower any given vein may not contain as great, or it may be even greater, riches as have been obtained from it before? In the case before us the appearances of the 310 fm. level are far more favourable, both as to breadth and richness, than they are 10 fms. higher up. Another remarkable case is that of the Fowey Consols, which came to an untimely end a few years ago, when it had reached a depth of 320 fms. from the surface. The vein was of the average breadth, and yielded ores of moderate richness; but at the then price of copper the adventurers found it impossible to continue the workings without loss. Perhaps still more notable are cases in which the minerals are of greater intrinsic value. At Andreasberg, in what I regret to say has also become an extinct mine, the facts were very singular. I visited the spot a little while ago, and found with great regret that the works were discontinued. At a certain depth the lode was 14 in. in breadth, but it contained very rich galena and ruby silver ores, and so was worked on till at 100 fms. deep the lode opened out to as much as 100 yards wide. After a time it became pinched up, and this alternation was repeated. The whole depth was 420 fms. from the surface, and the bottom portion of the lode when they left off was 10 or 15 in. in breadth, and, therefore, as large as at the surface. The moral is simply this, that the cost of pumping out water, and raising the mineral, and other expenses, are so much increased that a vein that is good enough to pay at 100 fms. is not good enough at 400 fms. There is, however, one important fact which should never be lost sight of, and that is that no example exists in which a true lode came to an end in depth. They may be found pinched up when they get into rocks which are of a different character, so that they may not be followed down to any further depth, but have not, however, ceased. This rule holds good even with very small veins. The silver vein of Kongsberg, in Norway, is only from 2 to 4 in. broad, and sets down in rocks as hard as adamant, but at 260 fms. deep it continues still strong, and setting downwards; and it may be that, if the miners have perseverance to follow it further, a bunch of ore of great riches may be reached. Many curious questions arise in connection with the depth of lodes. Thus, in Cardiganshire it used to be said that lead ore would not make below 40 fms., but in these more enterprising days lead is worked at 150 fms. At a place called Llangwynog, in Montgomeryshire, there is a rich mine of solid galena, the adjoining rock being a greenstone, which after a time wedged it out, and it was lost; and although small strings were still observable, they contained no lead ore. There was a change of rock to shale, which accounted for the alteration in the nature of the vein; and it is a matter for exploration and consideration, before proceeding with such workings, whether there is any reason for anticipating a change. In foreign countries, veins which have put on such an appearance of continued poverty that in this country they would probably have been abandoned, have been carried over the dead parts, and have afterwards become extremely profitable. This is accounted for by the fact that such mines have been worked by the Government, and a certain proportion of the profits have been systematically set aside to pay for the working when the lode became unprofitable—forming, in fact, a reserve fund with which to push through these dead places. In Hungary and Saxony, and at Rammelsberg, in the Hartz, workings to a depth of from 200 to 300 fms. are not infrequent, and in many instances are carried to much greater depths than in this country. One of the deepest groups of mines is that at Przibram, in Bohemia, some of the workings being 400 fms. deep. In former days the Tyrol was famous for deep workings, but those of the present day in that country are shallower.

The lecturer, who had illustrated most of the cases mentioned by elaborate drawings on the board, concluded by warning his hearers against mistaking what are called "gash veins" for true lodes. Gash veins frequently contained large masses of valuable minerals, but they were simply V-like openings on the surface, which, as a rule, did not descend very far. In drawing up reports it was of the utmost importance to take care that the real character of the deposit has been ascertained, and particularly with regard to foreign or colonial enterprises on which English capital is to be laid out. Thus, in a true vein there may be good reason for expecting improvement in the depth, but in a "gash vein" a large breadth at the surface will inevitably in a brief space narrow off, and disappear. If, then, the students wished neither to deceive themselves nor (perhaps unwittingly) deceive others they would be careful not to trust too much to superficial appearances. (Cheers.)

MINERAL RESOURCES OF IRELAND—THE DONEGAL GRANITES.—At a recent meeting of the Royal Geological Society of Ireland considerable interest was exhibited with regard to some beautifully polished specimens of Donegal granite, from a district which will doubtless at no distant period be well known in the commercial world. In calling attention to the specimens, Dr. Haughton observed that they were brought there by Mr. Harte, the County Surveyor of Donegal, and that as to their rich lustre and brilliancy of colour there could be no question. At present they got their red granite from Peterhead, near Aberdeen, and where, in spite of the want of any natural advantage, the industry of the Scotch had created a large and thriving trade, upon a mere barren rock. He knew the locality where Mr. Harte got this granite, and had examined it for scientific purposes himself, and he had no hesitation whatever in saying that this granite would bear the most favourable comparison with that of Peterhead, commonly called Aberdeen granite; for the granite of Aberdeen itself was gray, like the Dublin granite. Why should they, then, go out of their own country to get granites when they had such fine materials as these beautiful specimens now exhibited?—Mr. Harte remarked that it was during the investigation of the scientific question affecting those granites that he had, in company with Prof. Haughton and Mr. Scott, their late secretary, become acquainted with them, and since then recognised their value in a commercial point of view. The largest specimen now before them had received its polish in the marble mills of the Messrs. Sibthorpe, of Corkhill, in that city—gentlemen who had already done so much to develope the use of Irish marbles, and who, he had no doubt, would do the same as regards these granites. This granite, which he might remark was a good illustration of the practical benefit of a geological society, occupied only a small part of the area covered by the granites of Donegal, but quite sufficiently large a portion as to be practically unlimited, and had the advantage of being near a good port. The other coloured granites were more like the Peterhead granite, but quite inferior to this, but they had no granite in Scotland like this of Donegal. He had compared this granite with all the best Peterhead specimens he could get, and it was several shades higher and richer in colour than the latter—in fact, it was very brilliant, and took, as they could see, a beautiful polish. He was glad to say that the matter was in a fair way to success, and he had every expectation would prove highly remunerative. He was now commencing to quarry this granite.

CRUSHING AND PULVERISING.—The invention of Mr. R. FOSTER, of Liskeard, consists in machinery for crushing or reducing the mineral or other substance to coarse powder. This consists in the employment of edge runners and a pan, or of plain, fluted, or roughened rolls, or of a roll and stationary plate, or of stampers, or of squeezers, or of any one or more of these, of any convenient construction, working in combination or in a conjoined operation with novel mechanism, which also forms a portion of the invention. The substance or material to be ground may be supplied to the crushing mechanism either in a dry or wet state.

PREVENTING CORROSION IN BOILERS.—The invention of Messrs. G. HAWXHURST and J. POLLOCK, of San Francisco, consists in mingling with the distilled water within the boiler, or upon its way thereto, a strong solution of caustic lime, in such quantity and at such intervals of time that the water contained in the boiler will be a weak solution of the same.

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